Complete Summary

TITLE

Pneumonia: percent of patients who receive their first dose of antibiotics within 4 hours after arrival at the hospital.

SOURCE(S)

Specifications manual for national hospital quality measures, version 1.04. Centers for Medicare and Medicaid Services (CMS), Joint Commission on Accreditation of Healthcare Organizations (JCAHO); 2005 Aug. various p.

Measure Domain

PRIMARY MEASURE DOMAIN

Process

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the Measure Validity page.

SECONDARY MEASURE DOMAIN

Does not apply to this measure

Brief Abstract

DESCRIPTION

This measure is used to assess the percent of pneumonia patients who receive their first dose of antibiotics within 4 hours after arrival at the hospital.

RATIONALE

There is growing clinical evidence of an association between timely inpatient administration of antibiotics and improved outcome among pneumonia patients. One study found that Medicare pneumonia patients had improved survival if they received antibiotics within 4 hours of admission (Khan, 1990). Another study found that shortening the time-to-first-dose to 4 hours was associated with improved survival (McGarvey, 1993). In 1995 over 14,000 randomly selected Medicare pneumonia hospitalizations were examined. They found that patients who received their first dose of antibiotic within 3 hours were less likely to die within 30 days than were patients whose antibiotics were delayed, although this

association did not become statistically significant until 8 hours following arrival, when a 15% (P less than 0.001) reduction was noted (Meehan, 1995). More recently, a study of 13,771 Medicare pneumonia hospitalizations from 1998-99 found that 30-day mortality was 10% (P=0.04) lower and length of hospital stay was shorter among patients whose first antibiotic was administered within 4 hours when compared with those whose time to first dose was longer. Among patients who had not received antibiotics before arriving at the hospital, administration within 4 hours was associated with 17% reductions in mortality during both hospitalization (P=0.01) and the 30 days following admission (P=0.001) (Bratzler, 2001).

Based on these studies, the Infectious Diseases Society of America (2000) and the American Thoracic Society (2001) suggests 8 hours as the maximum time to first antibiotic administration. Data collected by the National Pneumonia Project indicate that among Medicare pneumonia patients age 65 or older who were hospitalized during 1998-99, the first dose was administered within 8 hours for 83.4%, within 6 hours for 74.9%, and within 4 hours for 57.7%. This represents a significant improvement from 1995, when corresponding rates were 79.4% at 8 hours, 68.8% at 6 hours, and 49.9% at 4 hours (CMS published data). For 1998-99, the rates of administration within 8 hours ranges from 38% to 91% among the states and territories.

PRIMARY CLINICAL COMPONENT

Pneumonia; antibiotic administration

DENOMINATOR DESCRIPTION

Pneumonia patients 18 years of age and older (see the related "Denominator Inclusions/Exclusions" field in the Complete Summary)

NUMERATOR DESCRIPTION

Number of pneumonia patients who received their first antibiotic dose within 4 hours after arrival at the hospital

Evidence Supporting the Measure

EVIDENCE SUPPORTING THE CRITERION OF QUALITY

- A clinical practice guideline or other peer-reviewed synthesis of the clinical evidence
- One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

NATIONAL GUIDELINE CLEARINGHOUSE LINK

- Update of practice guidelines for the management of community-acquired pneumonia in immunocompetent adults.

Evidence Supporting Need for the Measure

NEED FOR THE MEASURE

Overall poor quality for the performance measured
Use of this measure to improve performance
Variation in quality for the performance measured

EVIDENCE SUPPORTING NEED FOR THE MEASURE

Bartlett JG, Dowell SF, Mandell LA, File Jr TM, Musher DM, Fine MJ. Practice guidelines for the management of community-acquired pneumonia in adults. Infectious Diseases Society of America. Clin Infect Dis2000 Aug;31(2):347-82. [218 references] PubMed

Bratzler DW, Houck PM, Nsa W. Initial processes of care and outcomes in elderly patients with pneumonia [abstract]. In: American College of Emergency Physicians Research Forum; October 15, 2001; Chicago (IL).American College of Emergency Physicians; 2001.

Heffelfinger JD, Dowell SF, Jorgensen JH, Klugman KP, Mabry LR, Musher DM, Plouffe JF, Rakowsky A, Schuchat A, Whitney CG. Management of community-acquired pneumonia in the era of pneumococcal resistance: a report from the Drug-Resistant Streptococcus pneumoniae Therapeutic Working Group. Arch Intern Med2000 May 22;160(10):1399-408. PubMed

Houck PM, Bratzler DW, Nsa W, Ma A, Bartlett JG. Timing of antibiotic administration and outcomes for Medicare patients hospitalized with community-acquired pneumonia. Arch Intern Med2004 Mar 22;164(6):637-44. PubMed

Kahn KL, Rogers WH, Rubenstein LV, Sherwood MJ, Reinisch EJ, Keeler EB, Draper D, Kosecoff J, Brook RH. Measuring quality of care with explicit process criteria before and after implementation of the DRG-based prospective payment system. JAMA1990 Oct 17;264(15):1969-73. PubMed

Mandell LA, Bartlett JG, Dowell SF, File TM Jr, Musher DM, Whitney C. Update of practice guidelines for the management of community-acquired pneumonia in immunocompetent adults. Clin Infect Dis2003 Dec 1;37(11):1405-33. [235 references] PubMed

McGarvey RN, Harper JJ. Pneumonia mortality reduction and quality improvement in a community hospital. QRB Qual Rev Bull1993 Apr;19(4):124-30. PubMed

Meehan TP, Fine MJ, Krumholz HM, Scinto JD, Galusha DH, Mockalis JT, Weber GF, Petrillo MK, Houck PM, Fine JM. Quality of care, process, and outcomes in elderly patients with pneumonia. JAMA1997 Dec 17;278(23):2080-4. PubMed

Niederman MS, Mandell LA, Anzueto A, Bass JB, Broughton WA, Campbell GD, Dean N, File T, Fine MJ, Gross PA, Martinez F, Marrie TJ, Plouffe JF, Ramirez J, Sarosi GA, Torres A, Wilson R, Yu VL. Guidelines for the management of adults with community-acquired pneumonia. Diagnosis, assessment of severity,

antimicrobial therapy, and prevention. Am J Respir Crit Care Med2001 Jun;163(7):1730-54. PubMed

State of Use of the Measure

STATE OF USE

Current routine use

CURRENT USE

Accreditation
Collaborative inter-organizational quality improvement
Internal quality improvement
Pay-for-performance

Application of Measure in its Current Use

CARE SETTING

Hospitals

PROFESSIONALS RESPONSIBLE FOR HEALTH CARE

Measure is not provider specific

LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED

Single Health Care Delivery Organizations

TARGET POPULATION AGE

Age greater than or equal to 18 years

TARGET POPULATION GENDER

Either male or female

STRATIFICATION BY VULNERABLE POPULATIONS

Unspecified

Characteristics of the Primary Clinical Component

INCIDENCE/PREVALENCE

Unspecified

ASSOCIATION WITH VULNERABLE POPULATIONS

See "Burden of Illness" field.

BURDEN OF ILLNESS

In the United States (U.S.) pneumonia is the sixth most common cause of death. From 1979-1994, the overall rates of death due to pneumonia and influenza increased by 59%. Much of this increase is due to a greater population of persons aged 65 years or older, and a changing epidemiology of pneumonia, including a greater proportion of the population with underlying medical conditions at increased risk of respiratory infection.

EVIDENCE FOR BURDEN OF ILLNESS

Bartlett JG, Dowell SF, Mandell LA, File Jr TM, Musher DM, Fine MJ. Practice guidelines for the management of community-acquired pneumonia in adults. Infectious Diseases Society of America. Clin Infect Dis2000 Aug;31(2):347-82. [218 references] PubMed

UTILIZATION

Annually, 2-3 million cases of community acquired pneumonia result in 10 million physician visits; 500,000 hospitalizations; and 45,000 deaths.

More than 1.1 million hospitalizations due to pneumonia each year in the U.S.

EVIDENCE FOR UTILIZATION

Bartlett JG, Dowell SF, Mandell LA, File Jr TM, Musher DM, Fine MJ. Practice guidelines for the management of community-acquired pneumonia in adults. Infectious Diseases Society of America. Clin Infect Dis2000 Aug;31(2):347-82. [218 references] PubMed

Niederman MS, Mandell LA, Anzueto A, Bass JB, Broughton WA, Campbell GD, Dean N, File T, Fine MJ, Gross PA, Martinez F, Marrie TJ, Plouffe JF, Ramirez J, Sarosi GA, Torres A, Wilson R, Yu VL. Guidelines for the management of adults with community-acquired pneumonia. Diagnosis, assessment of severity, antimicrobial therapy, and prevention. Am J Respir Crit Care Med2001 Jun;163(7):1730-54. PubMed

COSTS

Unspecified

Institute of Medicine National Healthcare Quality Report Categories

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

Data Collection for the Measure

CASE FINDING

Users of care only

DESCRIPTION OF CASE FINDING

Discharges, 18 years of age and older, with a principal diagnosis of pneumonia or a principal diagnosis of septicemia or respiratory failure (acute or chronic) and an other diagnosis code of pneumonia

DENOMINATOR SAMPLING FRAME

Patients associated with provider

DENOMINATOR INCLUSIONS/EXCLUSIONS

Inclusions
Discharges with an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Principal Diagnosis Code of pneumonia or ICD-9-CM Principal Diagnosis Code of septicemia or respiratory failure (acute or chronic) and an ICD-9-CM Other Diagnosis Code of pneumonia as defined in Appendix A of the original measure documentation

Exclusions

- Patients received in transfer from another acute care or critical access hospital, including another emergency department
- Patients who had no Working Diagnosis of pneumonia at the time of admission
- Patients receiving Comfort Measures Only
- Patients who do not receive antibiotics during hospitalization or within 36 hours (2160 minutes) from the time of hospital arrival
- Patients who have received antibiotics within 24 hours prior to hospital arrival
- Patients less than 18 years of age
- Patients involved in protocols or clinical trials

DENOMINATOR (INDEX) EVENT

Clinical Condition
Institutionalization
Therapeutic Intervention

DENOMINATOR TIME WINDOW

Time window is a single point in time

NUMERATOR INCLUSIONS/EXCLUSIONS

Inclusions
Number of pneumonia patients who received their first antibiotic dose within 4 hours after arrival at the hospital

Exclusions
None

NUMERATOR TIME WINDOW

Fixed time period

DATA SOURCE

Administrative and medical records data

LEVEL OF DETERMINATION OF QUALITY

Individual Case

PRE-EXISTING INSTRUMENT USED

Unspecified

Computation of the Measure

SCORING

Rate

INTERPRETATION OF SCORE

Better quality is associated with a higher score

ALLOWANCE FOR PATIENT FACTORS

Unspecified

STANDARD OF COMPARISON

External comparison at a point in time
External comparison of time trends
Internal time comparison

Evaluation of Measure Properties

EXTENT OF MEASURE TESTING

In order to test the reliability of the Centers for Medicare and Medicaid Services (CMS) data abstraction in the 7th Statement of Work (SoW), 80 medical records were randomly selected each month from 2000 to 2001. Using 12 months of data, we calculated the kappa statistic and total agreement rate (AR) for antibiotics with 4 hours (Kappa = 0.80, AR = 90.6%).

EVIDENCE FOR RELIABILITY/VALIDITY TESTING

Bratzler DW. (Principal Clinical Coordinator, Oklahoma Foundation for Medical Quality, Oklahoma City). Personal communication. 2003 Mar 5. 1p.

Identifying Information

ORIGINAL TITLE

PN-5b: initial antibiotic received within 4 hours of hospital arrival.

MEASURE COLLECTION

National Hospital Quality Measures

MEASURE SET NAME

Pneumonia

SUBMITTER

Centers for Medicare & Medicaid Services
Joint Commission on Accreditation of Healthcare Organizations

DEVELOPER

Centers for Medicare and Medicaid Services/Joint Commission on Accreditation of Healthcare Organizations

ENDORSER

National Quality Forum

INCLUDED IN

Hospital Compare
Hospital Quality Alliance
National Healthcare Disparities Report (NHDR)
National Healthcare Quality Report (NHQR)

ADAPTATION

Measure was not adapted from another source.

RELEASE DATE

2000 Aug

REVISION DATE

2005 Aug

MEASURE STATUS

Please note: This measure has been updated. The National Quality Measures Clearinghouse is working to update this summary.

SOURCE(S)

Specifications manual for national hospital quality measures, version 1.04. Centers for Medicare and Medicaid Services (CMS), Joint Commission on Accreditation of Healthcare Organizations (JCAHO); 2005 Aug. various p.

MEASURE AVAILABILITY

The individual measure, "PN-5b: Initial Antibiotic Received Within 4 Hours of Hospital Arrival," is published in "Specifications Manual for National Hospital Quality Measures." This document is available from the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Web site. Information is also available from the Centers for Medicare & Medicaid Services (CMS) Web site. Check the JCAHO Web site and CMS Web site regularly for the most recent version of the specifications manual and for the applicable dates of discharge.

COMPANION DOCUMENTS

The following are available:

- A software application designed for the collection and analysis of quality improvement data, the CMS Abstraction and Reporting Tool (CART), is available from the CMS CART Web site. Supporting documentation is also available. For more information, e-mail CMS PROINQUIRIES at proinquiries@cms.hhs.gov.
- Joint Commission on Accreditation of Healthcare Organizations (JCAHO). A comprehensive review of development and testing for national implementation of hospital core measures. Oakbrook Terrace (IL): Joint Commission on Accreditation of Healthcare Organizations (JCAHO); 40 p. This document is available from the JCAHO Web site.
- Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Attributes of core performance measures and associated evaluation criteria. Oakbrook Terrace (IL): Joint Commission on Accreditation of Healthcare

Organizations (JCAHO); 5 p. This document is available from the JCAHO Web site.
- Hospital compare: a quality tool for adults, including people with Medicare. [internet]. Washington (DC): U.S. Department of Health and Human Services; 2005 [updated 2005 Sep 1]; [cited 2005 Apr 15]. This is available from the Medicare Web site.

NQMC STATUS

This NQMC summary was completed by ECRI on January 6, 2003. The information was verified by the Centers for Medicare/Medicaid Services on March 14, 2003. This NQMC summary was updated by ECRI on October 24, 2005. The information was verified by the measure developer on December 7, 2005.

COPYRIGHT STATEMENT

The Specifications Manual for National Hospital Quality Measures [Version 1.04, August, 2005] is the collaborative work of the Centers for Medicare & Medicaid Services and the Joint Commission on Accreditation of Healthcare Organizations. The Specifications Manual is periodically updated by the Centers for Medicare & Medicaid Services and the Joint Commission on Accreditation of Healthcare Organizations. Users of the Specifications Manual for National Hospital Quality Measures should periodically verify that the most up-to-date version is being utilized.

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